



Public Safety

Performance Testing

A safety-enhancing system tests workers' visual/motor responses

In the mid-1960s, preparing for future long duration space missions, NASA conducted a test in which four men were sealed in a realistically simulated space station for 90 days. The experiment had a dual purpose: testing components of an advanced life support system, and obtaining data on the physiological and psychological effects of long confinement.

Of particular importance was the measurement of the subjects' abilities to perform certain tasks and determination of how much their abilities were impaired by long isolation. Ames Research Center contracted with Systems Technology, Inc., Hawthorne, California, for development of an electronic Critical Tracking Task (CTT) system for analyzing and rating the subjects' visual/motor responses. Systems Technology was also asked to prepare a series of tracking tasks to be accomplished by the subjects.

The CTT technology has been used by government agencies in the years since: by NASA in astronaut function tests, by the Air Force to check pilots' abilities to control unstable aircraft, and by the National Highway Traffic Safety Administration in an experimental program to detect intoxicated drivers. In 1990 it was introduced to the commercial marketplace as FACTOR 1000®, a computer-based testing device that can be used daily to assess the fitness of employees involved in safety-related jobs. Performance Factors, Inc., (PFI), Alameda, California, is marketing the service to industry under a license agreement with Systems Technology, Inc.

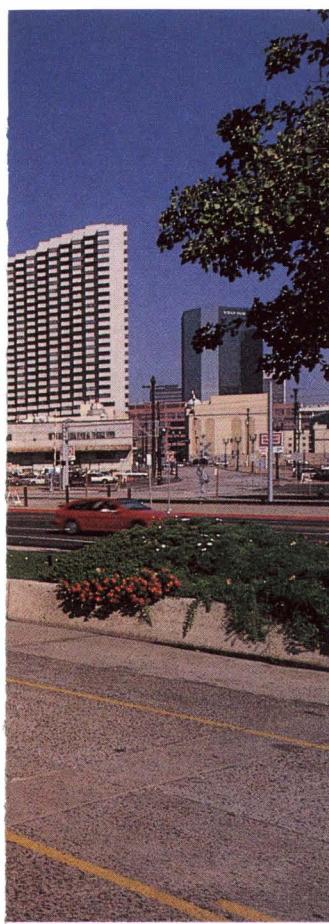


According to PFI, employee impairment — the inability of workers to perform their jobs safely and effectively — costs American businesses an estimated \$100 billion a year in terms of accidents, lost wages, damaged merchandise, medical claims and increased insurance premiums.

FACTOR 1000 detects impairment from a broad range of causes, including stress, fatigue, illness, drugs, or alcohol. With a non-invasive, self-administered test that takes less than a minute, the system provides an assessment of each employee's physical coordination skills prior to the start of each workday. By identifying the seriously impaired employee before the start of a shift, company management is better able to protect the safety of employees, the public and co-workers.

The use of FACTOR 1000 is illustrated by the experience of Old Town Trolley Tours, San Diego, California, one of the first companies to use the system. Old Town Trolley is a tour bus operation whose vehicles (**left and above**) wind through the narrow streets of Old Town and along the busy streets of the waterfront in downtown San Diego. The driver is also the tour guide; he must describe the sights and historical points of interest, answering many questions from his passengers, all the while staying alert to the hazards of vehicular traffic and the wanderings of pedestrians who constantly cross his path. It is not a job for an impaired operator.

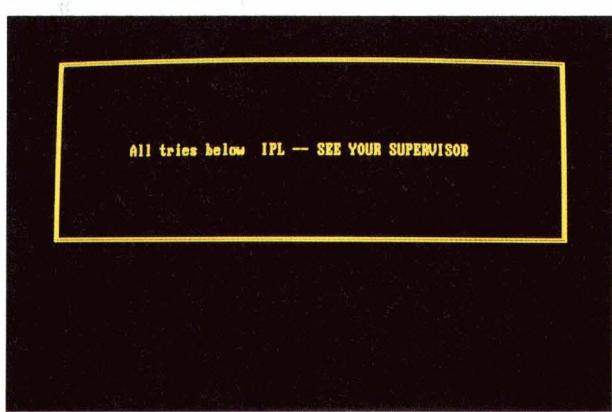
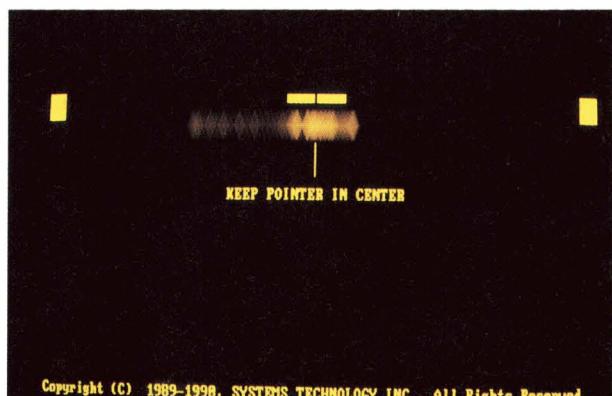
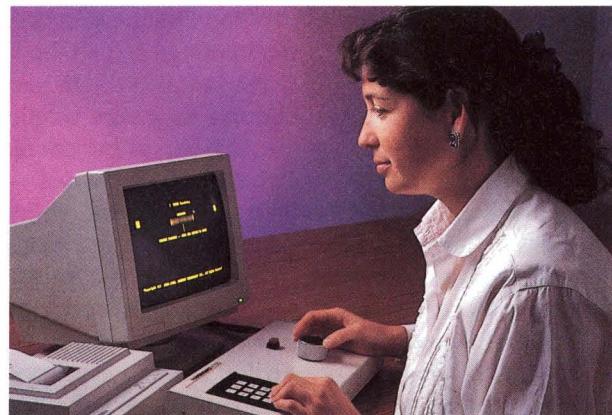
To prevent that possibility, each Old Town driver undergoes a daily FACTOR 1000 assessment



before he starts work. In the **top photo**, a company driver sits at a personal computer ready for the video-based test, which will evaluate her hand/eye coordination. She is first asked to identify herself by a password; the reason is that the computer program will compare today's result with the driver's baseline performance, established by previous tests. In this manner, the driver is tested against his own average level of performance, rather than an arbitrary skill

standard or the standards of other drivers. This assures an objective, personalized measure of performance.

The driver is required to manipulate a control knob to keep a randomly-moving pointer centered between two boundary markers on the computer screen (**center**). The computer is programmed to make the task increasingly difficult as the test proceeds. Each individual's performance on the test is compared with his or her own personal baseline



to determine fitness for duty. The test takes about 30 seconds.

FACTOR 1000 does not diagnose the specific cause of impairment. Test results are available to company management immediately after each test. When there is a "below baseline" report (**bottom**), a supervisor knows that the driver's hand/eye coordination is not functioning normally and he or she can take appropriate action. Such a process also encourages early identification of employees in need of help.

Also used in precision and heavy manufacturing retail distribution and cargo transportation, FACTOR 1000 is an effective and relatively inexpensive way of reducing the liabilities and costs related to accidents, product or equipment damage, workers compensation and health claims. It costs less than one dollar per workday per employee.

*The system
detects
impairment
from a broad
range of
causes,
including
stress,
fatigue,
illness, drugs,
or alcohol*

[®]FACTOR 1000 is a registered trademark of Performance Factors, Inc.